

At first it was thought that only males had been caught, but later, dissection revealed females in the ratio of 1 to 3.

Questions still to be answered about this extremely rare and attractive creature are: on what does it feed? why does it appear for such a short time? and why in such a restricted locality?

This year, time was not available to continue the investigations, for shortly after that, I went to South America, where, on one expedition to the Amazon jungle, several exotic rarities fell victim—but that is another story.

Notes on some South African Bees and Wasps

By J. S. TAYLOR

Since the publication of previous notes on the biology and behaviour of certain species of solitary bees at artificial nest sites at Port Elizabeth and Wilderness, C.P. (Taylor 1962, 1962, 1963, 1965), further work has been carried out at Hilton, Natal, and the following notes deal with the results obtained there. As far as the species of bee are concerned, the present notes are supplementary to those already published on the same species in the Eastern Cape Province. The nests used were exactly the same, i.e., blocks of wood containing three-inch lengths of plastic tubing, one quarter-of-an-inch in diameter.

While the three species of bee which occurred commonly at both Port Elizabeth and Wilderness were also found at Hilton, they were noted there much more sparingly and none could be described as common. Nesting operations were much more sporadic. This is thought to be at least partly due to the climatic conditions obtaining at Hilton. The altitude of the latter is some 3700 feet and it is situated in the mist belt. Damp mists occur frequently during the spring and summer months, while it is not unusual for the sun to be totally obscured by low cloud for several days at a time. As the bees are active only in sunny and warm weather, there were many days during which they remained inactive and did not venture outside their nests or tubes. Nest construction therefore frequently occupied lengthy periods, while many attempts were abortive or abandoned. This was especially the case in the summer of 1966/67 when the weather conditions were particularly wet and cool.

During the occasional warm spells the contrast was most marked; the rate of nest construction being accelerated considerably, and was more on a par with that noted in warmer parts of the country. It is also thought that the protracted nesting operations gave parasites a better opportunity to do their work; the percentage of parasitism being certainly higher at Hilton than in the Eastern Cape.

The three species of bee occurring at Hilton and the two Eastern Cape localities are dealt with below.

Heriades freygessneri Schletterer. (Megachilidae).

Very few nesting attempts by this species were observed at Hilton and of these only one such was successful. From a nest of two cells, sealed on 28th February 1965, an adult female bee emerged on 5th November of the same year, the period spent in the development stages therefore being 250 days, which is normal. From a nest of four cells, abandoned while under construction about 18th November 1966, an individual of *Anthrax*

triatomus Hesse (Bombyliidae) emerged on 16th April, 1967 and another on 28th April 1967. This parasite was also obtained from *Heriades freygessneri* at Port Elizabeth (Taylor 1962). Several individuals of the eulophid *Melittobia hawaiiensis* Perkins were later—July 1967—obtained from the same nest.

Megachile (Eutricharaea) gratiosa Gerstaecker.

Nesting by this species was first noted at Hilton on 22nd January 1966, it being even later than at Wilderness where in 1964 it commenced on 3rd January as compared with mid-August in Port Elizabeth (Taylor 1965). In 1967 this bee was not observed at the nest site until 27th January. The construction of a nest sometimes occupied up to 14 days if the weather was cool, damp and sunless. As in the case of *Heriades*, this often resulted in a nest being abandoned before completion. The duration of the immature stages at Hilton in summer varied from 79 to 110 days, being longer than at Wilderness and Port Elizabeth where 50 to 60 days were more usual.

It was noted that, as at the other localities, some individuals preferred the coloured petals of flowers to the more usual green leaves for nest construction. This leaf-cutting bee although more often noted at Hilton than *Heriades*, was by no means of common occurrence there and there were seldom more than two individuals using the nests at one time. In 1967 most of the nests, particularly those formed late in the summer, produced varying numbers of the eulophid *Melittobia hawaiiensis*. These nests were brought to the United Kingdom in June, and the parasite emerged from 15th July to 20th September (or from 119 to 165 days after the completion of the nest). This parasite was previously recorded from nests of the same bee at Port Elizabeth, but only during the summer (Taylor 1963). The percentage of parasitism by this eulophid was much higher at Hilton.

The species of *Coelioxys*, reared from nests of *M. gratiosa* at Port Elizabeth and previously referred to as *C. vumbula* Pasteels (Taylor 1965) has since been found to be *Coelioxys loricula* Smith. This parasite has hitherto been obtained from *M. gratiosa* only at Port Elizabeth.

From nests completed late in the summer of 1965 at Wilderness, C.P., adults emerged at Hilton from 31st December until 19th January 1966. When dismantling the nests at Wilderness in May 1965, preparatory to departure, the nest of a carder bee, hitherto unnoticed, was found in one of the tubes. Before this nest was unpacked at Hilton, late in the following October, ten male adults emerged from this particular nest and were found dead in the containing vial. In December two further individuals emerged, on the 24th and 31st respectively. This carder bee, the only species of its kind recorded at Wilderness, was subsequently determined as being *Pseudanthidium sjoestedti* (Friese) (Megachilidae). No carder bees were recorded at Hilton.

Nothylaeus heraldicus (Smith) (Colletidae).

This species, popularly known as the Membrane Bee, which occurred commonly at both Port Elizabeth and Wilderness, also frequented the nest sites at Hilton from time to time, but like the others was subject to weather conditions. The duration of the immature stages at Hilton occupied from 68 to 77 days in summer, somewhat longer than in the

Eastern Cape, and the maximum number of cells in a nest was five. The parasite *Gasteruption caffrarium* Schletterer, recorded at both the Cape localities, was likewise found at Hilton, and was seen at the nest site on several occasions. It was reared from one nest the adult parasite emerging 67 days after the nest was sealed. On 25th March 1966 a small species of chalcid emerged in large numbers from a nest of *N. heraldicus* at Hilton. This later proved to be a new species of *Coelopencystus*, and the first African one recorded from any host other than a xylocopid. Only one male was found among the specimens reared. On 1st August 1967. *Melittobia hawaiiensis* was obtained from a nest of *N. heraldicus*.

WASPS

While the incidence of bees at the nest sites at Hilton was disappointing, the occurrence of other occupants of the nests was more frequent and rewarding. The first indication of anything at the nests was on 1st December 1965 when a small black wasp was seen entering and leaving a beetle flight hole in one of the wooden blocks containing the tube or nests. Later on the same day the entrance to this hole was seen to be plugged or sealed with mud. On the following day a wasp was seen to be using a nest in an adjoining block, and by evening two complete cells were found towards the inner end of this particular tube, while the wasp was at rest in a curved position on the seal of the second cell. No further activity took place on the two following days, the weather being overcast, damp and cool, but when fine and warm weather returned on 6th December, activity was resumed, and the nest was sealed at the entrance on 9th December. This nest consisted of five occupied cells, each filled with small spiders, and one empty cell between the plugged entrance and the fifth occupied cell. The cells were separated by thin partitions of dry mud, with thicker plugs at the entrance and inner end. There appeared to be no other structure in the nests apart from the cell divisions and plugs. The spiders were for the most part immature individuals of the species of *Theridion*, a genus incompletely known in South Africa, and more common in the Northern Hemisphere. Up to 17 spiders have been found in one cell.

The wasp, or owner and builder of the nest, was determined as being *Pison transvaalensis* Cameron (Sphecidae). It is black and measures some 7 mm. in length. The egg is elongate, curved, opaque and cylindrical; it measures about 1 mm. in length, and is deposited on an immobilised spider, the curve of the egg fitting closely to the body of the spider. It hatches in 24 hours or less. The larval stage lasts some nine days, while the total duration of the developmental stages from the time of the sealing of the nest until the emergence of the progeny occupied from 51 to 68 days (October to March). Emergence may be spread over several days. The maximum number of cells per nest was five.

From several nests of this sphecid a species of Chrysiidae was obtained. This was determined as *Chrysis (Pentachrysis) inops* Gribodo. The developmental period of this parasitic wasp was sometimes considerably shorter than that of its host, in one case by as much as 26 days. Wasp nests brought to the United Kingdom in June 1967 produced many individuals of *Melittobia hawaiiensis*; these commenced to emerge in the middle of July and continued to do so until 20th September, or from 119 to 175 days from the time of the sealing of the nest. Apart from a few

chrysiids there were no other emergences from these nests. The eulophid would therefore appear to be a most effective controlling agent in this case. The sphecid was observed nesting at Hilton from October to March.

During winter another species of wasp with similar habits was recorded as occupying the nests at Hilton. This wasp behaved similarly to *Pison* and also preyed upon immature spiders: in this case two species of *Theridion* were involved. The wasp was indentified as *Auplopus* (*Conagenia*) *mazoensis* (Arnold), a member of the Pompilidae. It is a black and slender, somewhat ant-like wasp and measures about 8 mm. in length. From nests formed in autumn, adults emerged in September and October, while from those constructed in November, the resulting progeny emerged in the following February, developmental periods of 88 days being obtained. Up to four individuals have been obtained from one nest.

Nothing is known of the parasites of this species but it is thought that it is also affected by *Melittobia hawaiiensis*.

Climate again proved to be a factor in the lives of these wasps as in dull and damp weather there was little activity among them. However, they appeared to be quicker to avail themselves of dry and sunny intervals than were the bees, which may account for the fact that more of the nests were occupied by them.

SUMMARY

An account is given of certain species of bees and wasps in artificial nests at Hilton, Natal. In the case of the bees, these notes supplement previous ones concerning the same species at Port Elizabeth and Wilderness in the Eastern Cape Province. At Hilton, the climate as well as the parasite *Melittobia hawaiiensis* Perkins were controlling factors. Two species of wasp, *Pison transvaalensis* Cameron (Sphecidae) and *Auplopus* (*Conagenia*) *mazoensis* (Arnold) (Pompilidae), predatory upon small spiders *Theridion* spp., also occupied the nests at Hilton. Both species were affected by the climate, while *Pison* was heavily parasitised by the eulophid.

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